U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HOMELAND SECURITY RESEARCH CENTER
AND CBRNE CONSEQUENCE MANAGEMENT TEAM

Ambient Air Monitoring Plan
For the Field Study of Methyl Bromide Structural Fumigation

October 28, 2014

LIST OF ABBREVIATIONS AND ACRONYMS

AAMP	Ambient Air Monitoring Plan
ACGIH	American Conference of Governmental Industrial Hygienists
Ba	Bacillus anthracis
BI(s)	Biological Indicator(s)
CDC	Centers for Disease Control and Prevention
CFM	Cubic Feet per Minute
CMAT	CBRN Consequence Management Advisory Team
CT	Concentration x Time
°C	Degrees Celsius
°F	Degrees Fahrenheit
ft	Feet
HBr	Hydrogen Bromide
HSAP	Health, Safety, and Emergency Response Plan
HVAC	Heating, Ventilation, and Air Conditioning
IDLH	Immediately Dangerous to Life or Health
in.	Inch
lbs/hr	Pounds Per Hour
m	Meter(s)
MB	Methyl Bromide
mg/L	Milligrams per liter
mg-hr/L	Milligrams-hour per liter
MSDS	Material Safety Data Sheet
NHSRC	National Homeland Security Research Center
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Level
ppb	Parts per billion by volume
ppm	Parts per million by volume
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAP	Remedial Action Plan
RH	Relative Humidity
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
USEPA	United States Environmental Protection Agency

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1 Introduction

This Ambient Air Monitoring Plan (AAMP) describes the air monitoring procedures that will be employed during a methyl bromide (MB) fumigation study. Ambient air will be monitored for potential MB emissions, and to assess ambient MB concentrations at the site and in the surrounding community. Although the fumigation process has been designed to contain MB within the building, the proactive measures described here will be taken to protect public safety should a release occur.

2 Site History and Background

In 2001, a series of letters containing *Bacillus anthracis* (*Ba*) were mailed to various locations throughout the United States. It was determined that initial and residual contamination from *Ba* spores was difficult to detect, identify, and decontaminate in an efficient and expeditious manner. Additionally, significant costs were incurred during decontamination of buildings and equipment that had been suspected of having been contaminated.

Comments from government reports and congressional inquiries pointed out that sampling and decontamination methods were not standardized or validated. Deficiencies were observed when attempts were made to locate, characterize and remediate *Ba* contamination. Recommendations were made by these agencies to standardize and validate procedures that could be used to characterize biological agent contamination and follow on with efficient decontamination measures that would effectively clear buildings and associated areas. The latter part of these recommendations will be addressed, in part, within the scope of this fumigation study and are described in the project Quality Assurance Project Plan (QAPP).

Environmental decontamination and clearance are critical components of the comprehensive public health and environmental recovery strategy employed in the aftermath of a biological agent release. Capacity to decontaminate structures plays a critical role in the nation's resiliency. Currently, there is limited capacity to decontaminate biological agents from structures and outdoor areas. Fumigation with a sporicidal gas may be the most thorough method for structural disinfection. For over 60 years, MB has been used as a pesticide for soil, foodstuffs, and structures. Studies have shown the MB is efficacious in inactivating *Ba* spores and other microorganisms (Weinberg, 2004; Part I and Part II). In addition, the technology and skilled labor force currently used in the commercial fumigation industry can be used in a cost-effective manner for deployment of MB in response to a biological incident. MB has been banned from structural fumigations and is now used under exemptions to fumigate mostly agricultural imports and exports. However, in the event of a national emergency resulting from a *Ba* incident, MB may be a game changer, adding significantly to our resiliency by increasing our capacity to respond.

Place description of structure to be fumigated here.

3 Potential Compounds of Concern

The primary objective of the AAMP is to protect human health and the environment during the fumigation process. According to the MB label, the lower explosive limit can vary from 10-15 percent. The National Institute for Occupational Safety and Health (NIOSH) lists MB as a potential occupational carcinogen and recommends lowest feasible exposures and an immediately dangerous to life or health (IDLH) value of 250 ppm. OSHA's permissible exposure level (PEL) is 20 ppm (80 mg/m^3) with a skin notation and the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) is 1 ppm (3.9 mg/m^3) with a skin notation. (NIOSH, 2010) (http://www.cdc.gov/niosh/npg/npgd0400.html) (OSHA, 2004) (https://www.osha.gov/dts/chemicalsampling/data/CH_251900.html)

Methyl bromide

Synonyms & Trade Names Bromomethane, Monobromomethane

CAS No. 74-83-9	**RTECS No.** PA4900000	**DOT ID & Guide** 1062 123
Formula CH_3Br	**Conversion** 1 ppm = 3.89 mg/m^3	**IDLH** Ca [250 ppm] See: 74839

Exposure Limits

NIOSH REL : Ca See Appendix A
OSHA PEL †: C 20 ppm (80 mg/m^3) [skin]

Measurement Methods
NIOSH 2520;
OSHA PV2040
See: NMAM or OSHA Methods

Physical Description Colorless gas with a chloroform-like odor at high concentrations. [Note: A liquid below 38°F. Shipped as a liquefied compressed gas.]

MW: 95.0	**BP:** 38°F	**FRZ:** -137°F	**Sol:** 2%	**VP:** 1.9 atm	**IP:** 10.54 eV
Sp.Gr: 1.73 (Liquid at 32°F)	**Fl.P:** NA (Gas)	**UEL:** 16.0%	**LEL:** 10%	**RGasD:** 3.36	

Flammable Gas, but only in presence of a high energy ignition source.

Incompatibilities & Reactivities Aluminum, magnesium, strong oxidizers [Note: Attacks aluminum to form aluminum trimethyl, which is SPONTANEOUSLY flammable.]

Exposure Routes inhalation, skin absorption (liquid), skin and/or eye contact (liquid)

Symptoms irritation eyes, skin, respiratory system; muscle weak, incoordination, visual disturbance, dizziness; nausea, vomiting, headache; malaise (vague feeling of discomfort); hand tremor; convulsions; dyspnea (breathing difficulty); skin vesiculation; liquid: frostbite; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system

Cancer Site [in animals: lung, kidney & forestomach tumors]

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact (liquid)
Eyes: Prevent eye contact (liquid)
Wash skin: When contaminated (liquid)
Remove: When wet (flammable)
Change: No recommendation
Provide: Quick drench (liquid)

First Aid (See procedures)
Eye: Irrigate immediately (liquid)
Skin: Water flush immediately (liquid)
Breathing: Respiratory support

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0109 See MEDICAL TESTS: 0138

3-1- Basic chemical, physical, and health data for methyl bromide (NIOSH, 2010).

Hydrogen bromide

Synonyms & Trade Names Anhydrous hydrogen bromide; Aqueous hydrogen bromide (i.e., Hydrobromic acid)

CAS No. 10035-10-6	**RTECS No.** MW3850000	**DOT ID & Guide** 1048 125 (anhydrous) 1788 154 (solution)
Formula HBr	**Conversion** 1 ppm = 3.31 mg/m^3	**IDLH** 30 ppm See: 10035106
Exposure Limits **NIOSH REL** : C 3 ppm (10 mg/m^3) **OSHA PEL** †: TWA 3 ppm (10 mg/m^3)		**Measurement Methods** **NIOSH** 7903; **OSHA** ID165SG See: NMAM or OSHA Methods

Physical Description Colorless gas with a sharp, irritating odor. [Note: Shipped as a liquefied compressed gas. Often used in an aqueous solution.]

MW: 80.9	**BP:** -88°F	**FRZ:** -124°F	**Sol:** 49%	**VP:** 20 atm	**IP:** 11.62 eV
	Fl.P: NA	**UEL:** NA	**LEL:** NA	**RGasD:** 2.81	

Nonflammable Gas

Incompatibilities & Reactivities Strong oxidizers, strong caustics, moisture, copper, brass, zinc [Note: Hydrobromic acid is highly corrosive to most metals.]

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat; solution: eye, skin burns; liquid: frostbite

Target Organs Eyes, skin, respiratory system

Personal Protection/Sanitation (See protection codes) **Skin:** Prevent skin contact (solution)/Frostbite **Eyes:** Prevent eye contact (solution)/Frostbite **Wash skin:** When contaminated (solution) **Remove:** When wet or contaminated (solution) **Change:** No recommendation **Provide:** Eyewash (liquid), Quick drench (solution), Frostbite wash	**First Aid** (See procedures) **Eye:** Irrigate immediately (solution)/Frostbite **Skin:** Water flush immediately (solution)/Frostbite **Breathing:** Respiratory support **Swallow:** Medical attention immediately (solution)

Respirator Recommendations
NIOSH/OSHA

Up to 30 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]
(APF = 25) Any powered, air-purifying respirator with acid gas cartridge(s)[£]
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0282

3-2 - Basic chemical, physical, and health data for hydrogen bromide (NIOSH, 2010).

The risk of exposure to MB without warning is significant because MB is a colorless and odorless gas with a chloroform-like odor at very high concentrations. To address this significant risk, the AAMP details a MB monitoring plan with multiple and redundant measures.

Another compound of concern is hydrogen bromide (HBr). Hydrogen bromide is a potential breakdown product of MB. NIOSH lists an IDLH value of 30 ppm for HBr. OSHA's PEL is 3 ppm (10 mg/m^3) and ACGIH's TLV is 2 ppm (6.6 mg/m^3) ceiling. (NIOSH, 2010) (http://www.cdc.gov/niosh/npg/npgd0331.html) (OSHA, 2004) (https://www.osha.gov/dts/chemicalsampling/data/CH_246200.html)

4 Air Monitoring Objectives

For purposes of this monitoring program, ambient air is defined as air outside of the structure being fumigated. In particular, the objectives of the AAMP are to:

1. Measure concentrations of MB in ambient air surrounding the fumigated structure.
2. Compare atmospheric concentrations with site specific Action Levels developed during MB fumigation operations. The OSHA PEL ceiling[1] of 20 ppm of MB is dated and the ACGIH TLV of 1ppm will be used, since no short-term exposure limit (STEL) values for MB are published. The OSHA PEL for HBr is 3 ppm.
3. Describe operational response measures that will be taken in the event atmospheric concentrations of MB exceed established Action Levels during the fumigation period.

In order to achieve the program objectives MB gas concentrations in ambient air will be continuously monitored around the fumigated structure and in the surrounding area. Air monitoring will begin during the set-up of the fumigation equipment. Air monitoring will be completed when the following conditions have been satisfied:

a) All fumigation activities have been completed.

b) The post-fumigation concentration of MB in the structure is below the ACGIH's 8-hour Time Weighted Average value (TWA) of 1.0 part per million (ppm_v).

c) All tenting materials are removed from the structure.

During the fumigation process, weather conditions will be continuously monitored in order to assess the direction of potential migration routes for MB detected in ambient air. The monitoring data will be used to relocate mobile gas monitoring units and/or implement corrective actions.

[1] **Ceiling limit** is an airborne concentration of a toxic substance in the work environment, which should not be exceeded. If instantaneous monitoring is not feasible, then the ceiling is a 15-minute time-weighted average exposure not to be exceeded at any time during the working day.

4.1 Data Quality Control Procedures

Information regarding the instruments is provided in Section 7.0. In order to collect accurate and usable measurements, data quality procedures will be implemented, including:

- Calibrating all instruments according to manufacturer's instructions;
- Verifying instrument calibrations and responses during monitoring events by using clean filtered air;
- Documenting all calibration activities; and
- Reporting and documenting all QC results.

In addition, United States Environmental Protection Agency (USEPA) will utilize a tiered approach to monitoring. Multiple instruments will be used to measure MB in ambient air. These instruments will improve the data quality by increasing the ability to detect MB. They also utilize different monitoring techniques, thus increasing the likelihood that detections are accurate. Instruments to be utilized by USEPA and its contractors include:

- RAE Systems AreaRAE and MultiRAE
- Portable gas chromatograph with MB compatible column and conditions
- Key Chemical and Equipment Remote Data Acquisition (RDA) Fumiscopes
- Colorimetric tubes (Draeger MB tubes, etc.)

4.2 Background Data Collection

Prior to the start of fumigation, ambient monitoring for MB will commence. Ambient air monitoring will be conducted during setup of fumigation equipment to establish baseline readings and to assess the effects of potential interferences from other compounds. These data will be recorded in an ambient air monitoring log.

5 Description of the Fumigation Process

The fumigation process will involve exposing the interior of the facility to a target MB concentration for a set amount of time. Process parameters such as MB concentration, temperature and relative humidity will be monitored and controlled inside the structure during the fumigation by subcontractor. The overall process will consist of the following steps:

- The structure will be fully encapsulated in a seven layer ethylene vinyl alcohol (EVOH) tarp to prevent leakage of MB gas to the atmosphere.
- The structure will be conditioned to maintain desired relative humidity/temperature levels as described in the MB Fumigation Guidance.
- MB gas will be released into the structure.

- While MB is being released, the temperature will be maintained at or above 72 (check this and change to C) degrees °F and the RH will be maintained at or above 75 percent.
- MB concentration will be kept at or above 212 mg/L for 48-hours.
- The 36-hour concentration-time (CT) clock will start once the temperature, RH, and MB concentration reach the desired levels.
- The CT clock will be paused any time the temperature, RH, or MB concentration goes below one of these operational limits. It will restart once the limits are obtained again.
- If MB concentration at or beyond the warning tape (30' from structure) rises above a warning level, then checks will be made for leaks and corrective actions will be taken to mitigate them.
- When fumigation reaches the desired 36-hour CT, the MB gas inside the building will be removed by scrubbing exhaust flow with a series of activated carbon beds.
- When the activated carbon bed scrubber system has reached it's maximum effectiveness (scrubber stack concentration is equal to or greater than the structure concentration) then workers in appropriate PPE will open the tarps and place fans to assist the final aeration.
- The process will be concluded after MB levels inside the structure decline to acceptable levels for site workers to re-occupy.

Any changes to the AAMP will be documented in section 10.0 - Modifications to the AAMP.

6 Implementation Schedule

Air monitoring will be started before any fumigant is released and continue until all fumigation activities have been completed, including aeration. The process will be concluded after MB levels inside the building decline to acceptable levels for site workers to re-occupy in Level D protection.

To ensure proper placement of ambient air monitoring units, a site specific weather station will be deployed during initial operations so that meteorological data can be continuously collected during the fumigation process.

7 Monitoring Equipment

As previously described, several tiers of ambient air monitoring instruments will be utilized during the fumigation. The purpose of this approach is to provide additional health and safety precautions because a detector agent (chloropicrin) will not be utilized and MB at the levels used for fumigation does not have sufficient odor warning properties. The monitoring equipment will be co-located as much as possible so that multiple sensors are providing near-real time conditions for MB. The following subsections outline the various pieces of equipment and how they will be utilized for this project.

7.1 RAE System AreaRAE

USEPA will deploy an interconnected system of six AreaRAE gas detectors as the primary means to assess MB concentrations around the structure. RAE Systems AreaRAE is a one- to five-sensor gas detector with a photo-ionization detector (PID) installed. The PID provides real-time monitoring capabilities in the range of 0 to 10 ppm as volatile organics. The detector is responsive to MB and a 1.7 conversion factor[2] (RAE Systems, 2005) will be employed to correct its gross PID response readings to MB concentrations. The lowest reliable PID reading is approximately 0.1 ppm which is below the 0.5 ppm threshold for the AAMP air monitoring objectives. The AreaRAE can provide both time-weighted average (TWA) and STEL readings.

Each AreaRAE will be equipped with a 10.6 eV lamp and a wireless RF (radio frequency) modem. A RDK Host Controller or a personal computer will be used as a base station to continuously monitor each wireless AreaRAE deployed during the fumigation process. The controller will also allow for remote data logging conditions at each locality.

The AreaRAEs will be deployed in close proximity (within 30 feet) to the structure and at selected up and downwind locations. These "selected locations" will include any possible "sensitive receptors" or "at risk populations" that may be downwind or in close proximity to the structural fumigation site.

7.2 RAE System MulitRAE

The US EPA will deploy two (or more) RAE System MultiRAEs for leak detection and for personnel monitoring when checking the AreaRAEs or when entering within 30-feet of the structure being fumigated. The MultiRAE Pro uses a similar technology to the AreaRAE but is slightly more sensitive (lower detection limit). The MultiRAE Pros are light, handheld instruments that are easy to use.

7.3 Field Portable Gas Chromatograph (GC)

The US EPA will deploy gas collection bag technology at each stationary monitoring location to collect samples when high AreaRAE readings are obtained. The sampling bags will be collected and analyzed on site with the field portable GC (make and model TBD). The GC will be equipped with an appropriate MB column and operating conditions for optimal resolution of MB. This result will be our agent-specific analysis for identification and quantification of MB at the time and place where and when the sample was pulled. Although the PID systems are great detectors for MB without this additional analysis step we could not be sure the PIDs were reading MB as opposed to some other interfering organic chemical.

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[2] See RAE Systems TN-106 for the proper way to implement a conversion factor. For high concentration initial doses, it may be desirable to use a dilution fitting. See RAE Systems Technical Note TN-167.

7.4 Key Chemical and Equipment RDA Fumiscope

When not monitoring the inside-the-structure MB concentration, the fumiscopes will be used to monitor ambient air around the perimeter of the structure. The RDA Fumiscope provides essentially the same function as the standard fumiscope, such as measuring the thermal conductivity of various fumigants. The difference is that the RDA model can be left at the structure that is being fumigated and remotely accessed via the standard telephone system or cell phone from a remote computer (called the host computer). In addition the RDA model can sample and test four independent test points as opposed to the standard model's single test point.

The sampling ports of the RDA will be located approximately 30 feet from the structure similar to the AreaRAE sampling locations. Exhaust from the fumiscope will be routed back to the structure.

7.5 Colorimetric Tubes

Colorimetric tubes are a good means of detecting MB. Draeger colorimetric tubes are glass vials, filled with a chemical reagent that reacts to a specific chemical or family of chemicals. A calibrated 100ml sample of air is drawn through the tube with a Draeger Accuro bellows pump. If the targeted chemical(s) is present, the reagent in the tube changes color and the length of the color change typically indicates the measured concentration.

Draeger MB tubes will be collected every six hours from four perimeter AAMP sampling locations. As much as possible, the tubes will be collected near AreaRAE locations. However, it may be necessary to collect samples along seams in the tarps or at downwind locations based on current site conditions. Personnel will utilize Draeger tube model CH27301, MB tube 5/B, 5-50 ppm. The tube has some sensitivity to HBr and other halogenated hydrocarbons.

8 Monitoring Program Description

The Site AAMP will provide ambient air monitoring for MB. The Site AAMP utilizes a combination of stationary monitors and portable equipment, including PID based sensors (AreaRAEs and MultiRAE Pros), chromatography and colorimetric indicators. There use will be orchestrated to yield an orthogonal approach to detection, increasing the safety for workers and the public.

8.1 Work Zone Monitoring

Multiple MultiRAE Pros will be deployed with workers entering the designated work zone near the fumigated structure. MultiRAEs will be equipped with PID sensors corrected for MB response. Several MultiRAEs will be deployed for use by project personnel for leak detection and for personnel protection when near the fumigated structure. The exact monitoring locations will be determined based on where workers are working.

Initial data from the instruments will be used to identify potential leakages of MB from the building containment so that repairs and/or modifications can be made. Once these are corrected, the data will also be used to assist personnel with proper positioning of the instruments downwind to quantify MB concentrations at the property perimeter.

8.2 Perimeter Monitoring

Perimeter monitoring will be conducted using groups of AreaRAEs. Perimeter monitoring locations during fumigation will be approximately 30-feet from the structure and based on meteorological data. The AreaRAEs will monitor MB continuously and provide readings on a real-time basis. Readings will be used to determine compliance with ambient concentration Action Levels developed by USEPA for MB during fumigation operations.

Approximately six AreaRAEs will be setup at the perimeter and one unit will be in the support zone (additional monitors can be added if the structure is large, greater than 100,000 cubic feet). Generally, the locations will be downwind of the facility or near a sensitive receptor populations, if any.

9 Assessment and Response

Air monitoring for purposes of comparison to established ambient concentration threshold Action Levels for MB will be conducted using AreaRAEs and other monitoring equipment, bag samples followed by gas chromatography, will be used to verify MB concentrations. If the ambient concentrations of each compound remain below their respective Action Level thresholds, the fumigation will proceed as planned. If confirmed MB concentrations exceed any of their respective ambient threshold levels, the USEPA Principle Investigator will be immediately notified. Operational responses will be implemented in accordance with a series of proportionate measures that have been developed by USEPA for the various Action Levels.

In general, the ambient Action Level for MB has been designed to serve the following purposes:

- Action Level 1 (0.5 ppm) provides an early warning that ambient concentrations of MB have exceeded an established threshold level for an extended period of time and staff should be alerted.
- Action Level 2 indicates that ambient concentrations of MB have remained above an established threshold for an extended period of time despite troubleshooting and corrective action, and that additional MB should not be added to the building until ambient concentrations again fall below the threshold. At this point staff should be notified of a possible evacuation.
- Action Level 3 indicates that: (1) ambient concentrations of MB have remained above an

established threshold for an extended period of time despite troubleshooting, corrective action and cessation of MB addition to the building. If this level is achieved, the fumigation operation should be terminated until the source of emissions can be identified and corrected. At this level, the local fire department may notify nearby residents to evacuate or shelter in place as detailed in the HASP Evacuation Plan.

The respective ambient threshold Action Level for MB are shown in Table 9-1, along with a summary of the operational response measures that will be taken with respect to the fumigation in the event that any of the Action Levels are exceeded at any point during the operation. If the Action Level 3 threshold for evacuation for non-essential personnel is reached, then evacuation of these personnel will be conducted as described in the Health, Safety and Emergency Response Plan and the Evacuation Plan. If residential evacuations are necessary, the local authorities will coordinate the evacuations.

Table 9-1 Ambient Action Levels and Response Actions

Constituent of Concern	Monitoring Location	Action Level Definition / Response	
		USEPA Limit	Action
MB	Perimeter	0.5 ppm_V 15-min TWA	Action level 1: if the AreaRAEs 15-min rolling average is ≥ 500 ppb_V, then staff will be alerted. Action level 2: if a second consecutive 15-min rolling average is ≥ 500 ppb_V , then troubleshooting and corrective action will be implemented. Staff will be notified of possible evacuation. Action level 3: if a third consecutive SPM 15-min average is ≥ 0.5 ppmv, then MB additions will be ceased, and the building will be actively scrubbed. Non-essential staff will be evacuated.
MB	Work Zone	0.5 ppm_V Peak	Action level 1: if the AreaRAE Peak is ≥ 0.5 ppmv MB, then the staff will be alerted. Action level 2: if the AreaRAE Peak remains at ≥ 0.5 ppm_V MB, then troubleshootingand corrective action will be implemented. Staff will be notified of possible evacuation.
MB	Work Zone	1.0 ppm_V Peak	Action level 3: if the AreaRAE Peak continues to be ≥ 1.0 ppm_V MB despite corrective actions, MB introduction into the structure will be ceased and the building will be actively scrubbed. Non-essential staff will be evacuated.

10 Modifications to the AAMP

If any modifications are made to the AAMP following approval, they will be documented in writing and attached to the original AAMP. Changes to the AAMP must be approved by the Unified Command.

11 References

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